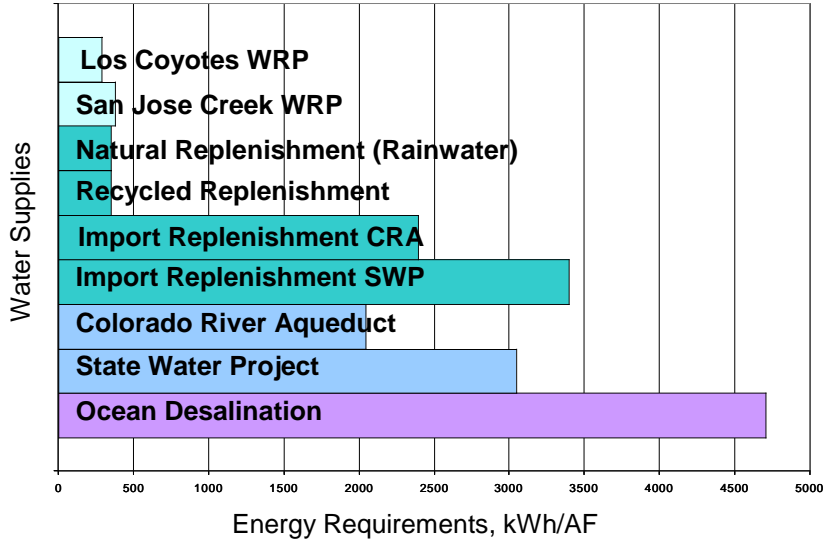
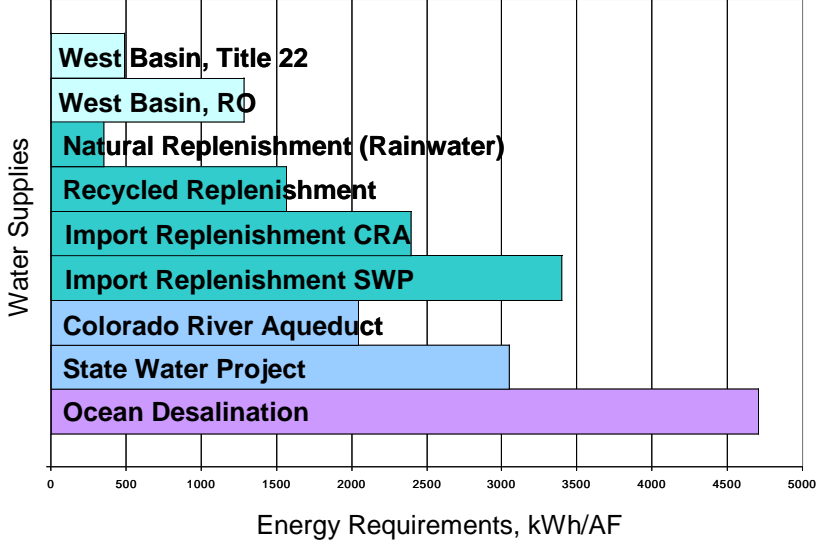




Central Basin Energy Requirements for Water Supplies



West Basin Energy Requirements for Water Supplies



Groundwater

Groundwater within the Central Basin MWD and West Basin MWD service areas is replenished with four water sources: natural recharge, SWP supplies, CRA supplies, and recycled water supplies.

Central Basin MWD replenishes groundwater via spreading grounds. Imported water, both SWP and CRA, and recycled water are applied to spreading grounds where they naturally percolate into the soil. Recycled water is treated with RO prior to spreading.

West Basin MWD replenishes groundwater via wells. Recycled water is treated with RO prior to injection.

Central Basin Groundwater				
	Rate af/year	Transport Energy kWh/af	Treatment Energy kWh/af	Delivery Energy kWh/af
Natural Replenishment (rainwater)	101,793	350	0	0
Recycled Replenishment	59,255	350	0	0
Import Replenishment, CRA	12,956	2,350	44	0
Import Replenishment, SWP	11,105	3,350	44	0
West Basin Groundwater				
	Rate af/year	Transport Energy kWh/af	Treatment Energy kWh/af	Delivery Energy kWh/af
Natural Replenishment (rainwater)	19,720	350	0	0
Recycled Replenishment	8,381	555	790	220
Import Replenishment, CRA	11,831	2,350	44	0
Import Replenishment, SWP	9,367	3,350	44	0

For more information, please visit
www.centralbasin.org
www.westbasin.org
www.dwr.water.ca.gov

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Water Sources "Powering" Southern California:

*Imported Water, Recycled Water,
Ground Water, and Desalinated Water*

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West Basin MWD



California Department
of Water Resources



Central Basin MWD

Background

Southern California relies on imported and local water supplies for both potable and non-potable uses. Imported water travels great distances through both the California and Colorado Aqueducts before arriving in Southern California, consuming a large amount of energy in the process. Local sources of water often require less energy and provide a sustainable supply of water. Three water source alternatives which are found or produced locally and could reduce the amount of imported water are ocean water, groundwater, and recycled water.



Figure 1 – Location Map within Southern California

Energy Intensity

Energy intensity is the total amount of energy, calculated on a whole-system basis, required for the use of a given amount of water in a specific location. The total energy embodied in a unit of delivered water varies with location, source, and use within the state.

Four Water Sources:

- Imported Water
- Recycled Water
- Groundwater
- Desalinated Water

Total energy requirements:

- Transport energy
- Treatment energy
- Delivery energy

Imported Water

Water diversion, conveyance, and storage systems developed in California in the 20th Century move millions of acre-feet (af) of water around the state annually. The Central Basin and West Basin MWDs receive imported water from Northern California through the State Water Project (SWP) and Colorado River water via the Colorado River Aqueduct (CRA). Both systems are operated by Metropolitan Water District of Southern California.

Energy requirements for imported water include transport and treatment. The water exiting the treatment plant is at sufficient pressure for delivery throughout the system.

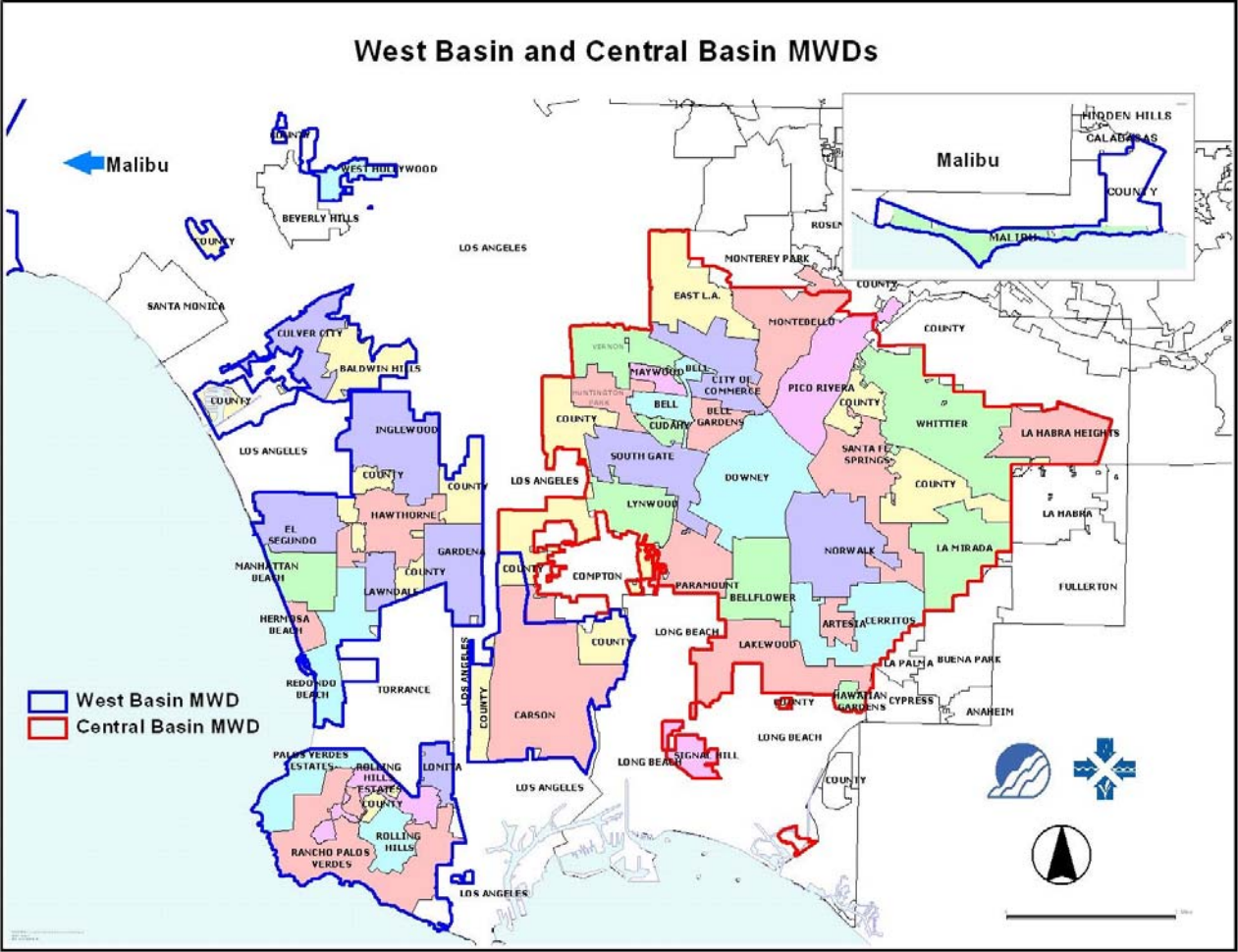
Recycled Water

Many cities in California are using advanced treatment processes and filtering technology to recycle water for irrigation, industrial and other uses.

Central Basin MWD receives recycled water from two treatment plants operated by the Sanitation Districts of Los Angeles County, Los Coyotes Water Reclamation Plant (WRP) and San Jose Creek WRP. Treatment energy is not considered due to the fact that all the water must be treated for discharge purposes, regardless if there is re-use or not.

West Basin MWD receives water treated to secondary standards from the Los Angeles Hyperion Treatment Plant. This water is transported to the West Basin Water Recycling Plant where it undergoes various treatment processes depending on the use.

Figure 2 – Regional Map for Central Basin and West Basin MWD’s



Central Basin Imported Water				
	Rate af/yr	Transport Energy kWh/af	Treatment Energy kWh/af	Delivery Energy kWh/af
State Water Project (SWP)	29,900	3,000	44	0
Colorado River Aqueduct (CRA)	39,650	2,000	44	0
West Basin Imported Water				
	Rate af/yr	Transport Energy kWh/af	Treatment Energy kWh/af	Delivery Energy kWh/af
State Water Project (SWP)	57,600	3,000	44	0
Colorado River Aqueduct (CRA)	76,300	2,000	44	0

Data presented in this fact sheet was collected from the Central Basin and West Basin MWD service areas.

Central Basin Recycled Water				
	Rate af/yr	Transport Energy kWh/af	Treatment Energy kWh/af	Delivery Energy kWh/af
Los Coyotes WRP	375	0	0	285
San Jose Creek WRP	3,375	0	0	380
West Basin Recycled Water				
	Rate af/yr	Transport Energy kWh/af	Treatment Energy kWh/af	Delivery Energy kWh/af
West Basin WRP, Title 22	21,500	205	0	285
West Basin WRP, RO	14,340	205	790	285

Ocean Water Desalination

Desalination techniques range from distillation to recently developed reverse osmosis technologies. Current applications around the world are dominated by the “multistage flash distillation” process and RO, approximately 44% and 42% of the world’s application, respectively. Reducing salt levels from over 30 parts per thousand (ppt) to 0.5 ppt, using existing technologies requires considerable amounts of energy either for thermal processes or for the pressure to drive water through extremely fine filters, or some combination of each. Recent improvements in energy efficiency have reduced the amount of thermal and pumping energy required for the various processes, but high energy intensity is still a concern.

West Basin MWD is in the process of developing plans to construct an ocean water desalinating plant. The values presented in the graphs are derived from the plant estimates for energy requirements. Plant design assumes an energy recovery device is in place downstream of the RO and averages 31% recovery. Water will be blended with imported water and distributed at the imported water pressure; thus no additional energy is required for distribution.

West Basin Ocean Desalinated Water				
	Rate af/year	Transport Energy kWh/af	Treatment Energy kWh/af	Delivery Energy kWh/af
West Basin Desalination Plant	22,400	278	4,430	0